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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,790	06/27/2003	Alan Michael Jaffee	7302	6842

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EXAMINER	
BOYD, JENNIFER A	
ART UNIT	**PAPER NUMBER**
1771	

DATE MAILED: 09/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/608,790	JAFFEE, ALAN MICHAEL	
	Examiner	Art Unit	
	Jennifer A. Boyd	1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 June 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 – 7, 9, 11 – 23, 25 – 29 and 30 - 33* is/are pending in the application.

4a) Of the above claim(s) *30* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 – 7, 9, 11 – 23, 25 – 29 and 31 - 33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/26/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 26, 2006 has been entered. The IDS and Accompanying Remarks, filed June 26, 2006, have been entered and have been carefully considered. Claims 1 – 7, 9, 11 – 23, 25 – 29 and 30 - 33 are pending and claim 30 is withdrawn. In view of Applicant's arguments concerning Graves in regards to the Examiner's suggestion to provide unexpected results (not appropriate for a rejection under 102), the Examiner has revised the rejection over Graves below. Despite these advances, the invention as currently claimed is not found to be patentable for reasons herein below.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

3. Claims 1 – 7, 9, 12 – 15, 17 - 18, 29 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graves (US 5,389,716).

Graves is directed to a fire resistant cured binder for fibrous mats (Title), the mats being suitable for a backing layer to gypsum (column 3, lines 30 – 40).

As to claims 1, 29 and 32 - 33, Graves teaches that the fibrous mat can comprise a binder composition and a mixture of glass and mineral fibers (column 3, lines 44 – 50). The fibrous mat comprises mineral wool fibers having a diameter between 2 and 6 microns (column 9, lines 50 – 60) which may be in part substituted with glass fibers (column 11, lines 33 – 37) having a diameter between 3 and 30 microns (column 10, lines 15 – 25). The glass fibers may be chopped glass fiber strands having a length between 1 mm and 75 mm (column 10, lines 15 – 25). Graves teaches that the fine staple fibers have a length of 6 – 76 mm (column 9, lines 50 – 60). The Examiner equates the glass fibers to Applicant's "chopped continuous glass fibers" and the mineral wool fibers to Applicant's "fine staple fibers". The weight ratio of the wool fibers to the glass fibers may range from 0:1 to 1:0 (column 11, lines 54 – 60) and the binder comprises 3 – 40% by weight of the mat (column 4, lines 34 – 40). It should be noted that facer materials such as the one described by Graves are traditionally applied to both sides of the gypsum board, thus the Examiner equates the mat to Applicant's "first and second facers". It should be noted that the limitation of "hydraulic set" is not given any patentable weight because of the method of making the gypsum board is not germane to the issue of patentability of the product itself.

As to claims 2 and 3, Graves teaches that the glass fibers can comprise c-glass, t-glass and e-glass (column 10, lines 4 – 15).

As to claim 8, Graves teaches that the fine staple fibers may comprise mineral wool fibers (column 9, lines 50 – 60).

As to claim 17, Graves requires that the second facer is a fibrous mat. It should be noted that facer materials such as the one described by Graves are traditionally applied to both sides of the gypsum board, thus the Examiner equates the mat to Applicant's "first and second facers".

As to claim 18, Graves teaches that the binder can comprise modified urea-aldehyde (column 4, lines 14 – 23); Graves notes that the aldehyde can comprise formaldehyde (column 6, lines 30 – 50).

As to claim 24, Graves teaches that additional ingredients may be formulated into the latex and/or resin to aid in processing and vary the end-use properties of the fibrous mat (column 8, lines 44 – 50). Graves teaches that mildewcides and/or fungicides may be added to provide stability toward degradation (column 8, lines 50 – 57).

Graves teaches broad ranges which encompass Applicant's claimed ranges as discussed above but fails to teach the specific claimed ranges of Applicant. Graves fails to teach chopped glass fibers having a diameter between 8 – 17 microns, fine staple fibers having an average fiber diameter of less than about 5.5 microns and the fine staple fibers present in the amount of 1 – 30 % by dry weight of the web as required by claims 1, 29 and 32 - 33. Graves fails to teach that the chopped glass fibers have an average diameter range from 10 – 16 microns as required by claim 4. Graves fails to teach that the chopped glass fibers have an average fiber length ranging from 5 to 30 mm as required by claim 5. Graves fails to teach that the glass fibers have an average fiber diameter of about 11 +/- 1.5 microns as required by claim 6. Graves fails to teach that the glass fibers have an average fiber length ranging from 6 – 12 mm as required by claim 7. Graves fails to teach that the fine staple fibers have an average fiber diameter less than about 3.5 microns as required by claim 12. Graves fails to teach that the fine staple fibers have an average diameter of less than about 1.9 microns as required by claim 13. Graves fails to teach that the fine staple fibers have a fiber length of less than about 7 mm as required by claim 14. Graves fails to teach

that the minor portion of the dry web ranges from 20 – 30% as required by claim 15. Graves notes that the diameter, length and amount of the various types of fibers are result effective variables. Graves indicates that "fibers of varying sizes may be blended together to form the mat. By varying the length and diameter of the fibers, the structural properties of the finished product may be altered" (column 11, lines 10 – 15). Graves further indicates that "it is known that mineral wool by be partially or wholly substituted for glass wool in a blended mat" (column 11, lines 33 – 40). Graves teaches that "the ratio of wool fibers to glass fibers also has a direct effect on the functional properties of the finished mat. In general, as the percentage of the wool fibers is increased relative to the percentage of glass fibers, the finished mat tends to be become more brittle, less foldable, and has decreased tensile strength. However, the fire resistance of the mat increases as the percentage of the wool fibers increases" (column 12, lines 1 – 15). Graves additionally notes that "The functional properties of the finished mat are also affected by the dimensions of the fibers. Longer fibers and fibers having a larger diameter will tend to produce a finished mat with a coarser hand. Conversely, shorter, smaller diameter fibers contribute to a mat having a relatively softer hand. Thus, both the ratio of mineral wool fibers to glass fibers, and the dimensions of each of the fibers selected will affect the functional properties of the finished mat. The precise combination of the fibers used in the mat depends upon the functional properties of the desired finished mat" (column 12, lines 10 – 25). It would have been obvious to one having ordinary skill in the art at the time the invention was made to create a fibrous mat having Applicant's claimed specific ranges since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In the present invention, one would have been motivated to optimize

the average fiber diameters, fiber lengths and the ratio of the fibers in order to create a mat with the desired strength, hand, fire resistance and functional and structural properties.

As to claims 28 and 32, although Graves does not explicitly teach the claimed flame resistance to pass the test of ASTM Method E84, Class 1 as required by claim 28 and a permeability of at least 250 cfm/ft^2 at a differential pressure of 0.5 inches of water as required by claim 32, it is reasonable to presume that said properties are inherent. Support for said presumption is found in the use of like materials (i.e. a gypsum board having a facing layer comprising a mixture of varying diameter glass fibers and a binder) which would result in the claimed properties. The burden is upon the Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594. In addition, the presently claimed property would obviously have been present once the Graves product is provided. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977).

4. Claim 16 remains rejected under 35 U.S.C. 103(a) as being unpatentable over Graves (US 5,389,716) in view of Horner, Jr. et al. (US 6,365,533).

Graves teaches the claimed invention above but fails to disclose that the second facer can comprise kraft paper.

Horner, Jr. et al. is directed to a foamed facer suitable for use in the construction industry comprising a dry preformed glass fiber mat containing a binder (Abstract). Horner teaches that the first and second facers can be of the same or of a different composition than that of this invention. More specifically, one of the facer sheets maybe be selected from those

conventionally employed such as kraft paper and the other facer sheet is one of the current invention which enhances the composite (column 6, lines 1 – 15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a kraft paper as one of the facer materials as suggested by Horner, Jr. et al. in the gypsum board composite of Jaffee motivated by the desire to save manufacturing costs by employing a conventional facer on one side and the improved and enhanced facer on the other side.

5. Claim 26 remains rejected under 35 U.S.C. 103(a) as being unpatentable over Graves (US 5,389,716) in view of Carbo et al. (US 2004/0209071).

Jaffee teaches the claimed invention above but fails to teach that the core further comprises a biocide.

Carbo is directed to a mold resistant acoustical panel (Title). Carbo notes that attempts have been made to reduce microbe growth by introducing biocides, such as fungicides and bactericides, into coatings for acoustical panels. Although some protection against microbe growth is obtained, it is short-lived under severe conditions. When the entire panel contains nutrients for microbes, the relatively small amount of biocide in the coating may not be sufficient to protect the larger amount of food available in the core of the panel (page 1, [0006]). Carbo teaches that the composition of the present invention protects the core of the panel, a function which is not guaranteed by antimicrobial coatings. The biocide in the core affords protection to the entire panel, even if no coating is used (page 2, [0013]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a biocide into the core as suggested by Carbo in the composite of Graves motivated by the desire to afford microbe growth protection to the entire panel (Carbo, pages 1 – 2).

6. Claims 25 and 27 remains rejected under 35 U.S.C. 103(a) as being unpatentable over Graves (US 5,389,716) in view of Lehnert et al. (US 4,647,496).

Graves teaches the claimed invention above but fails to teach that the gypsum core comprises at least one water repellant agent as required by claim 25 and reinforcing fiber as required by claim 27.

Lehnert is directed to a fibrous mat-faced gypsum board for exterior-finishing systems for buildings (Title). The board comprises a gypsum core and a fibrous mats as facing materials (column 9, lines 5 – 10). The gypsum core preferably contains an additive to improve the ability of the gypsum composite to resist being degraded by water, for example, to resist dissolution (column 9, lines 50 – 60). Lehnert teaches that the gypsum core can further comprise a paper fiber which acts as a viscosity-control agent (column 13, lines 15 – 20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate an water repellant agent as suggested by Lehnert in the core of Graves motivated by the desire to improve the resistance of the composite to water.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate fiber into the gypsum core as suggested by Lehnert in the core of Graves motivated by the desire to control the viscosity of the slurry during manufacturing.

7. Claims 1 – 7, 9, 11 - 14, 17 – 18, 23, 28 - 29 and 32 – 33 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Kajander (US 5,837,621) in view of Gill et al. (US 4,637,951).

Kajander is directed to fire resistant glass fiber mats (Title) suitable for facer materials for gypsum wall components (column 6, lines 60 – 68 and column 1, lines 45 – 50).

As to claims 1, 29 and 32, Kajander teaches a gypsum wall board having facer components comprising a nonwoven mat containing glass fibers having diameters in the range of 3 – 30 microns, most preferably 10 – 17 microns (column 7, lines 10 – 25). Kajander teaches that the fibers can be up to about 3 inches in length (column 7, lines 20 – 30). Kajander notes that generally the longer the fiber, the higher the tensile and tear strengths of the mat, but the poorer the fiber dispersion (column 7, lines 25 – 30). Kajander notes that the glass fibers used normally have about the same length but fibers of different lengths and *diameters* can be used to get different characteristics in a known manner (column 7, lines 20 – 27). Kajander teaches the use of 10 – 40% weight percent of binder based on the total weight of the glass fibers (column 8, lines 35 – 40).

As to claims 2 - 3, Kajander teaches that the fibers can comprise e-glass or c-glass fibers (column 7, lines 30 – 35).

As to claim 9, Kajander teaches that the glass fibers can comprise various glass fiber of different lengths (column 7, lines 20 – 30).

As to claim 11, Kajander teaches that the fibers can comprise e-glass or c-glass fibers (column 7, lines 30 – 35).

As to claim 17, it should be noted that facer materials such as the one described by

Kajander are traditionally applied to both sides of the gypsum board, thus the Examiner equates the mat to Applicant's "first and second facers".

As to claim 18, Kajander teaches that the resin can comprise nitrogen containing components such as melamine formaldehyde resin, urea formaldehyde resin, melamine modified phenol formaldehyde and resins such as acrylic resin (column 5, lines 50 – 67).

Kajander fails to teach a major portion of chopped glass fibers having a diameter range from about 8 – 17 microns and a minor portion of fine staple fibers having a diameter less than about 5.5 microns, where the minor portion comprises 1 – 30% by weight of the dry web, or specifically 20 – 30% as required by claim 15.

Gill is directed to fibrous mat facers with improved strike-through resistance (Title). Gill teaches glass mats comprising a mixture of two types of glass fibers, both being glass monofilament fibers (column 3, lines 5 – 10). The first type, or base fibers, comprise glass monofilament fibers of conventional form and composition. Generally, these fibers are made by a continuous filament process and chopped to discrete and predetermined lengths and range from 8 – 25 microns in diameter (column 3, lines 15 – 25). Gill notes that the lower diameter limit is set by process restraints. The upper limit is determined by material usage considerations as well as hand or feel of the final mat material. The coarser fibers result in an abrasive and irritating feel which would make such a mat undesirable (column 3, lines 20 – 25). The other basic fibers in the mat are microfibers having a mean diameter range from 0.05 to 3.5 microns (column 3, lines 40

– 58). Gill teaches that the lower practical amount of microfibers ranged from about 2 – 37% (column 6, lines 10 – 30).

It would have been obvious to one of ordinary skill in the art to use the suggested mixture of glass fibers where the microfibers are present in the amount of 2 – 37% by weight of the mat as discussed by Gill in the mat of Kajander motivated by the desire to create a facer with improved strike-through resistance and skin-irritation problems.

As to claims 1, 4 – 7, 12 – 14, 29, 32 and 33, Kajander in view of Gill discloses the claimed invention except for that the chopped glass fibers have an average fiber diameter ranging from about 8 – 17 microns and the microfibers have a range less than about 5.5 microns as required by claims 1, 29 and 32 - 33, the chopped glass fibers have a diameter range from about 10 – 16 microns as required by claim 4, the chopped glass fiber length ranging from 5 – 30 mm as required by claim 5, the chopped glass fibers have a diameter range of about 11 +/- 1.5 microns as required by claim 6, the glass fiber having an average length ranging from 6 – 12 mm as required by claim 7, the average fiber diameter of the fine staple fibers are less than 3.5 microns as required by claim 12, the fine staple fiber have a diameter of less than about 1.9 microns as required by claim 13 and the fine staple fibers have a fiber length of less than 7 mm as required by claim 14. It should be noted that fiber diameter and length are result effective variables. Gill notes that the fiber diameter is dictated by process restraints for the lower limit and material usage considerations and hand for the upper limit (see Gill, column 3, lines 15 – 25). Kajander notes that the fiber length influences the ease of processing and the strength of the mat. The longer the fiber, the higher the tensile and tear strengths of the mat, but the poorer the

fiber dispersion (see Kajander, column 7, lines 20 – 30). It would have been obvious to one having ordinary skill in the art at the time the invention was made to create the chopped glass fibers have an average fiber diameter ranging from about 8 – 17 microns and the microfibers have a range less than about 5.5 microns as required by claims 1, 29 and 32 - 33, the chopped glass fibers have a diameter range from about 10 – 16 microns as required by claim 4, the chopped glass fiber length ranging from 5 – 30 mm as required by claim 5, the chopped glass fibers have a diameter range of about 11 +/- 1.5 microns as required by claim 6, the glass fiber having an average length ranging from 6 – 12 mm as required by claim 7, the average fiber diameter of the fine staple fibers are less than 3.5 microns as required by claim 12, the fine staple fiber have a diameter of less than about 1.9 microns as required by claim 13 and the fine staple fibers have a fiber length of less than 7 mm as required by claim 14 since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In the present invention, one would have been motivated to optimize the fiber diameters and fiber lengths in order to create a mat having a non-abrasive and irritating hand and sufficient strength making it suitable for facing materials for gypsum boards.

As to claims 23, 28 and 32, although Kajander in view of Gill does not explicitly teach the claimed glass transition temperature ranging from 15 – 45 degrees C as required by claim 23, flame resistance to pass the test of ASTM Method E84, Class 1 as required by claim 28 and a permeability of at least 250 cfm/ft^2 at a differential pressure of 0.5 inches of water as required by claim 32, it is reasonable to presume that said properties are inherent. Support for said

presumption is found in the use of like materials (i.e. a gypsum board having a facing layer comprising a mixture of varying diameter glass fibers and claimed binder) which would result in the claimed properties. The burden is upon the Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594. In addition, the presently claimed property would obviously have been present once the Kajander in view of Gill product is provided. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977).

8. Claim 16 remains rejected under 35 U.S.C. 103(a) as being unpatentable over Kajander (US 5,837,621) in view of Gill et al. (US 4,637,951) as applied above, and further in view of Horner, Jr. et al. (US 6,365,533).

Kajander in view of Gill teaches the claimed invention above but fails to disclose that the second facer can comprise kraft paper.

Horner, Jr. et al. is directed to a foamed facer suitable for use in the construction industry comprising a dry preformed glass fiber mat containing a binder (Abstract). Horner teaches that the first and second facers can be of the same or of a different composition than that of this invention. More specifically, one of the facer sheets maybe be selected from those conventionally employed such as kraft paper and the other facer sheet is one of the current invention which enhances the composite (column 6, lines 1 – 15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a kraft paper as one of the facer materials as suggested by Horner, Jr. et al. in the gypsum board composite of Kajander in view of Gill motivated by the desire to save

manufacturing costs by employing a conventional facer on one side and the improved and enhanced facer on the other side.

9. Claim 26 remains rejected under 35 U.S.C. 103(a) as being unpatentable over Kajander (US 5,837,621) in view of Gill et al. (US 4,637,951) as applied above, further in view of Carbo et al. (US 2004/0209071).

Kajander in view of Gill teaches the claimed invention above but fails to teach that the core further comprises a biocide.

Carbo is directed to a mold resistant acoustical panel (Title). Carbo notes that attempts have been made to reduce microbe growth by introducing biocides, such as fungicides and bactericides, into coatings for acoustical panels. Although some protection against microbe growth is obtained, it is short-lived under severe conditions. When the entire panel contains nutrients for microbes, the relatively small amount of biocide in the coating may not be sufficient to protect the larger amount of food available in the core of the panel (page 1, [0006]). Carbo teaches that the composition of the present invention protects the core of the panel, a function which is not guaranteed by antimicrobial coatings. The biocide in the core affords protection to the entire panel, even if no coating is used (page 2, [0013]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a biocide into the core as suggested by Carbo in the composite of Kajander in view of Gill motivated by the desire to afford microbe growth protection to the entire panel (Carbo, pages 1 – 2).

10. Claims 25 and 27 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Kajander (US 5,837,621) in view of Gill et al. (US 4,637,951) as applied above, further in view of Lehnert et al. (US 4,647,496).

Kajander in view of Gill teaches the claimed invention above but fails to teach that the gypsum core comprises at least one water repellant agent as required by claim 25 and reinforcing fiber as required by claim 27.

Lehnert is directed to a fibrous mat-faced gypsum board for exterior-finishing systems for buildings (Title). The board comprises a gypsum core and a fibrous mats as facing materials (column 9, lines 5 – 10). The gypsum core preferably contains an additive to improve the ability of the gypsum composite to resist being degraded by water, for example, to resist dissolution (column 9, lines 50 – 60). Lehnert teaches that the gypsum core can further comprise a paper fiber which acts as a viscosity-control agent (column 13, lines 15 – 20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate an water repellant agent as suggested by Lehnert in the core of Kajander in view of Gill motivated by the desire to improve the resistance of the composite to water.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate fiber into the gypsum core as suggested by Lehnert in the core of Kajander in view of Gill motivated by the desire to control the viscosity of the slurry during manufacturing.

11. Claims 1 – 7, 9, 11 - 14, 18 – 23, 28 – 29 and 31 - 33 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Jaffee et al. (US 6,187,697) in view of Gill et al. (US 4,637,951).

Jaffee is directed to nonwoven fibrous mats suitable for facing gypsum boards (column 1, lines 25 – 35).

As to claims 1, 9, 29 and 31 - 33, Jaffee teaches a mat comprising a majority of glass fibers. The fibers used in the nonwoven portion should be at least 0.25 inch or longer (6.35 mm or longer) but mixtures of fibers of different lengths and/or fiber diameters can be used as is known (column 5, lines 25 – 35). The binder used to bond the fibers can be any binder capable of bonding the fibers together.

As to claims 2 – 3 and 11, Jaffee teaches that the glass fibers can be e, c, t, s or any known type glass fiber of good strength and durability in the presence of moisture and mixtures of lengths and diameters (column 5, lines 35 – 45).

As to claims 18 – 19 and 22, Jaffee teaches the use of UF or MF binders modified with polyvinyl acetate and or acrylic (column 5, lines 45 – 55).

Jaffee fails to teach a major portion of chopped glass fibers having a diameter range from about 8 – 17 microns and a minor portion of fine staple fibers having a diameter less than about 5.5 microns, where the minor portion comprises 1 – 30% by weight of the dry web, or specifically 20 – 30% as required by claim 15.

Gill is directed to fibrous mat facers with improved strike-through resistance (Title). Gill teaches glass mats comprising a mixture of two types of glass fibers, both being glass monofilament fibers (column 3, lines 5 – 10). The first type, or base fibers, comprise glass monofilament fibers of conventional form and composition. Generally, these fibers are made by a continuous filament process and chopped to discrete and predetermined lengths and range from 8 – 25 microns in diameter (column 3, lines 15 – 25). Gill notes that the lower diameter limit is set by process restraints. The upper limit is determined by material usage considerations as well as hand or feel of the final mat material. The coarser fibers result in an abrasive and irritating feel which would make such a mat undesirable (column 3, lines 20 – 25). The other basic fibers in the mat are microfibers having a mean diameter range from 0.05 to 3.5 microns (column 3, lines 40 – 58). Gill teaches that the lower practical amount of microfibers ranged from about 2 – 37% (column 6, lines 10 – 30).

It would have been obvious to one of ordinary skill in the art to use the suggested mixture of glass fibers where the microfibers are present in the amount of 2 – 37% by weight of the mat as discussed by Gill in the mat of Jaffee motivated by the desire to create a facer with improved strike-through resistance and skin-irritation problems.

As to claims 20 – 21, Jaffee in view of Gill discloses the claimed invention except for that the cross-linker is present in the amount of ranging up to about 10 weight percent as required by claim 20 and is present in the amount of 2 – 5 weight percent as required by claim 21. The amount of cross-linker affects the level of cross-linking present in the final structure. The level of cross-linking relates to the strength and flexibility of the product. It would have been obvious to

one having ordinary skill in the art at the time the invention was made to create the mat where the crosslinker is present in the amount of ranging up to about 10 weight percent as required by claim 20 and is present in the amount of 2 – 5 weight percent as required by claim 21 since it has been held that where general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454 USPQ 233 (CCPA 1955). In the present invention, one would have been motivated to optimize the amount of cross-linker in order to create a suitably strong and flexible mat for use as a facer for a gypsum board.

As to claims 1, 4 – 7, 12 – 14, 29, 32 and 33, Jaffee in view of Gill discloses the claimed invention except for that the chopped glass fibers have an average fiber diameter ranging from about 8 – 17 microns and the microfibers have a range less than about 5.5 microns as required by claims 1, 29 and 32 - 33, the chopped glass fibers have a diameter range from about 10 – 16 microns as required by claim 4, the chopped glass fiber length ranging from 5 – 30 mm as required by claim 5, the chopped glass fibers have a diameter range of about 11 +/- 1.5 microns as required by claim 6, the glass fiber having an average length ranging from 6 – 12 mm as required by claim 7, the average fiber diameter of the fine staple fibers are less than 3.5 microns as required by claim 12, the fine staple fiber have a diameter of less than about 1.9 microns as required by claim 13 and the fine staple fibers have a fiber length of less than 7 mm as required by claim 14. It should be noted that fiber diameter and length are result effective variables. Gill notes that the fiber diameter is dictated by process restraints for the lower limit and material usage considerations and hand for the upper limit (see Gill, column 3, lines 15 – 25).

Additionally, it is known that fiber length influences the ease of processing and the strength of the mat. The longer the fiber, the higher the tensile and tear strengths of the mat, but the poorer the fiber dispersion. It would have been obvious to one having ordinary skill in the art at the time the invention was made to create the chopped glass fibers have an average fiber diameter ranging from about 8 – 17 microns and the microfibers have a range less than about 5.5 microns as required by claims 1, 29 and 32 - 33, the chopped glass fibers have a diameter range from about 10 – 16 microns as required by claim 4, the chopped glass fiber length ranging from 5 – 30 mm as required by claim 5, the chopped glass fibers have a diameter range of about 11 +/- 1.5 microns as required by claim 6, the glass fiber having an average length ranging from 6 – 12 mm as required by claim 7, the average fiber diameter of the fine staple fibers are less than 3.5 microns as required by claim 12, the fine staple fiber have a diameter of less than about 1.9 microns as required by claim 13 and the fine staple fibers have a fiber length of less than 7 mm as required by claim 14 since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In the present invention, one would have been motivated to optimize the fiber diameters and fiber lengths in order to create a mat having a non-abrasive and irritating hand and sufficient strength making it suitable for facing materials for gypsum boards.

As to claims 23, 28 and 32, although Jaffee in view of Gill does not explicitly teach the claimed glass transition temperature ranging from 15 – 45 degrees C as required by claim 23, flame resistance to pass the test of ASTM Method E84, Class 1 as required by claim 28 and a permeability of at least 250 cfm/ft^2 at a differential pressure of 0.5 inches of water as required by

claim 32, it is reasonable to presume that said properties are inherent. Support for said presumption is found in the use of like materials (i.e. a gypsum board having a facing layer comprising a mixture of varying diameter glass fibers and claimed binder) which would result in the claimed properties. The burden is upon the Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594. In addition, the presently claimed property would obviously have been present once the Jaffee in view of Gill product is provided. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977).

Response to Arguments

12. Applicant's arguments filed June 26, 2006 have been fully considered but they are not persuasive.

Applicant argues that Graves does not teach the particular range limitations of Applicant's claims. Please see the amended rejection above. Applicant argues that the Examiner's analysis fails to address how present claim 1, which delineates a non-woven fibrous mat characterized by a far more specific and narrow ranges than any mat generally or specifically disclosed or suggested by Graves, rises to the level of specificity required to constitute anticipation under Lee. Applicant has provided a Table on page 8 of the Arguments indicating the required features of the instant application and of Graves. Applicant requires that the chopped glass fiber average diameter is between 8 – 17 microns while Graves requires 3 – 30 microns. Applicant requires a fine staple fiber average diameter of less than 5.5 microns while Graves requires 2 – 6 microns. Applicant requires the proportion of fine staple fibers to be 1 – 30% while Graves requires 0 – 100%. The Examiner agrees that Graves teaches a broad range of

glass fiber diameter, fine staple fiber diameter and proportion of fine staple fibers, however, the disclosure of Graves still overlaps the Applicant's claimed ranges. However, in the newly applied rejection above, the Examiner submits that the fiber diameters, fiber lengths and ratio of types of fibers have been established by Graves as a result effective variable and it would be obvious to optimize the ranges of Graves to Applicant's claimed ranges. As discussed in the MPEP, the Applicant must provide evidence of unexpected results within the narrow range to show lack of anticipation and/or unobviousness.

Applicant argues that nothing Graves discloses or teaches a gypsum board having a surface that is aesthetically acceptable when finished by painting. Although Graves does not indicate that the gypsum board has a surface that is aesthetically acceptable when finished by painting, it should be noted that it has been held that "the use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain". See *In re Heck*, 699 F.2d 1331, 1332 – 33, 216 USPQ 1038, 039 (Fed Cir. 1983). Furthermore, such a limitation is not claimed and evidence is not provided to affirm that the aesthetically acceptable surface when finished by painting is due to the use of Applicant's claimed narrow ranges. The Examiner submits the same arguments for Applicant's other argued properties such as high permeability, smooth surface with a ***surprisingly*** low content of fine staple fibers and smooth final surface ***surprisingly*** not correlated with the smooth of the board before fabrication. The Applicant has stated that these properties are surprising but has not supported it with evidence. Applicant indicates that evidence of unexpected results for the narrower range is shown in the Specification; the Applicant points to the Examples 3, 5 and 6 and Comparative Example 1 in

particular. The Examiner submits that Comparative Example 1 does not provide a fair comparison because it only shows the results of one data point where the chopped glass fiber diameter is 13 microns and is present in the amount of 79% by weight. The showing of a low smoothness rating for the Comparative Example does not provide evidence that other data points outside the claimed range would show a similarly low smoothness rating. Additionally, Comparative Example 1 does not take into account the use of a combination of chopped glass fibers and fine staple fibers as claimed by Applicant and discussed by the prior art reference, Graves. In order to show unexpected results, the Applicant must compare the closest prior art (in this case, Graves) with the claimed invention. If the Applicant can provide evidence at multiple data points that the claimed ranges result in an unexpected smooth surface and compare to multiple data points outside Applicant's claimed ranges but within the ranges of Graves result which have a low smoothness rating, the Applicant will provide a proper showing of unexpected results.

Applicant argues that properties claimed in claims 28 and 32 are not inherent to Graves. Please see the revised rejection above. The Applicant submits that there is a substantial difference between the disclosed gypsum board and the board disclosed by Graves. As discussed in the revised rejection above, the Examiner has submits that the fiber diameters, fiber lengths and ratio of types of fibers have been established by Graves as a result effective variable and it would be obvious to optimize the ranges of Graves to Applicant's claimed ranges. In light of this, the Graves mat is considered to be identical to the claimed mat of the Applicant. Therefore, the Examiner maintains the assertion of inherency for the properties claimed in claims 28 and 32. Applicant argues that Gill teaches an air permeability of no more than 225 cubic feet/min while

Applicant claims at least 250 cubic feet/min in claim 32. The Examiner submits that the Gill reference is not relied upon for teaching a level of permeability and used only as a secondary reference to teach the combination of microfibers and chopped glass fibers with a certain diameter range. Furthermore, this argument does not apply to Graves because it has now been established that Graves is considered to be identical to the claimed mat of the Applicant, due to optimization of parameters.

Applicant argues that the rejections of Graves in view of Horner, Graves in view of Carbo and Graves in view of Lehnert do not cure the lack of disclosure of Applicant's claimed invention. Please see the rejections above.

Applicant traverses the Examiner's motivation for combining Kajander in view of Gill. For the purposes of review, Kajander teaches a gypsum wall board having facer components comprising a nonwoven mat containing glass fibers having diameters in the range of 3 – 30 microns, most preferably 10 – 17 microns (column 7, lines 10 – 25). Kajander teaches that the fibers can be up to about 3 inches in length (column 7, lines 20 – 30). Kajander notes that generally the longer the fiber, the higher the tensile and tear strengths of the mat, but the poorer the fiber dispersion (column 7, lines 25 – 30). Kajander notes that the glass fibers used normally have about the same length but fibers of different lengths and *diameters* can be used to get different characteristics in a known manner (column 7, lines 20 – 27). Kajander teaches the use of 10 – 40% weight percent of binder based on the total weight of the glass fibers (column 8, lines 35 – 40). It should be noted that Kajander acknowledges that a combination of glass fibers with different diameters can be used. Gill is directed to fibrous mat facers with improved strike-through resistance (Title). Gill teaches glass mats comprising a mixture of two types of glass

fibers, both being glass monofilament fibers (column 3, lines 5 – 10). The first type, or base fibers, comprise glass monofilament fibers of conventional form and composition. Generally, these fibers are made by a continuous filament process and chopped to discrete and predetermined lengths and range from 8 – 25 microns in diameter (column 3, lines 15 – 25). Gill notes that the lower diameter limit is set by process restraints. The upper limit is determined by material usage considerations as well as hand or feel of the final mat material. The coarser fibers result in an abrasive and irritating feel which would make such a mat undesirable (column 3, lines 20 – 25). The other basic fibers in the mat are microfibers having a mean diameter range from 0.05 to 3.5 microns (column 3, lines 40 – 58). Gill teaches that the lower practical amount of microfibers ranged from about 2 – 37% (column 6, lines 10 – 30). Applicant argues that there is no indication in the recited passage that the hand and feel of the mat relate to the microfiber content. It should be noted that Gill only teaches the use of two types of glass fibers. It is reasonable to assume that the desire to restrict the amount of coarse fibers due to the hand and feel of the mat correlates with the properties imparted by the microfibers. Therefore, there is sufficient motivation to combine Kajander and Gill.

Applicant argues that Kajander in view of Gill does not teach the particular range limitations of Applicant's claims. Applicant argues that the Examiner's analysis fails to address how present claim 1, which delineates a non-woven fibrous mat characterized by a far more specific and narrow ranges than any mat generally or specifically disclosed or suggested by Kajander in view of Gill, rises to the level of specificity required to constitute anticipation under Lee. According to the MPEP, "If the claims are directed to a narrow range, the reference teaches a broad range, *and there is evidence of unexpected results within the narrow range*, depending

on the facts of the case, it may be reasonable to conclude that the narrow range is not disclosed with 'sufficient specificity' to constitute an anticipation of claims. The unexpected results may also render the claims unobvious". MPEP 2131.03. The Examiner agrees that Kajander in view of Gill teaches a broad range of glass fiber diameter, fine staple fiber diameter and proportion of fine staple fibers, however, the disclosure of Kajander in view of Gill still overlaps the Applicant's claimed ranges. As discussed in the MPEP, the Applicant must provide evidence of unexpected results within the narrow range to show lack of anticipation and/or unobviousness. Applicant indicates that evidence of unexpected results for the narrower range is shown in the Specification, in particular in the analysis and discussion of the Comparative Example 1 and the Examples. The Examiner submits that Comparative Example 1 does not provide a fair comparison because it only shows the results of one data point where the chopped glass fiber diameter is 13 microns and is present in the amount of 79% by weight. The showing of a low smoothness rating for the Comparative Example does not provide evidence that other data points outside the claimed range would show a similarly low smoothness rating. Additionally, Comparative Example 1 does not take into account the use of a combination of chopped glass fibers and fine staple fibers as claimed by Applicant and discussed by the prior art reference, Kajander in view of Gill. In order to show unexpected results, the Applicant must compare the closest prior art (in this case, Kajander in view of Gill) with the claimed invention. If the Applicant can provide evidence at multiple data points that the claimed ranges result in an unexpected smooth surface and compare to multiple data points outside Applicant's claimed ranges but within the ranges of Kajander in view of Gill result which have a low smoothness rating, the Applicant will provide a proper showing of unexpected results.

Applicant argues the Examiner's reliance on *In re Boesch* and submits that the reliance on *Boesch* is misplaced. Applicant argues that the Examiner has not identified any disclosure or suggestion that the alleged result effective variable has the effect of producing a smooth board. It should be noted that "The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art for all they contain". *In re Heck*, 699 F.2d 1331, 1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983) (quoting *In re Lemelson*, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968)). See MPEP 2123. Although Gill may not discuss how the ranges would affect the smoothness of the board, Gill does indicate that the fiber diameter range is a known result effective variable by indicating that "fiber diameter is dictated by process restraints for the lower limit and material usage considerations and hand for the upper limit. The coarser fibers result in an abrasive and irritating feel which would make a mat less desirable (see Gill, column 3, lines 15 - 25). If Applicant submits that the claimed ranges result in unexpected smoothness, the burden is upon the Applicant to provide evidence as discussed in detail above.

Applicant argues that the rejections of Kajander in view of Gill and Horner, Kajander in view of Gill and Carbo and Kajander in view of Gill and Lehnert do not cure the deficiencies of Kajander in view of Gill. The Examiner submits that Kajander in view Gill render Applicant's invention obvious as discussed above.

Applicant argues that Jaffee fails to teach that the inventive mat can be used as a facer for a gypsum board. The Examiner points to column 1, lines 1 – 15, where Jaffee discusses the use of mats of Jaffee as a facer for all types of board. Although in this passage Jaffee does not particularly disclose gypsum boards, in lines 30 – 35 of the same column, Jaffee acknowledges

that similar mats are used to face gypsum boards. The Examiner submits that this provides a teaching to use the mat as a facer for a gypsum board.

Applicant argues that the material of Jaffee is a two-layered mat while the facers of the instant invention are composed of a single layer. The Examiner submits that a two-layered mat can be considered to be "a layer". It should be noted that the Applicant does not claim a "single layer".

Applicant argues that Gill does not cure the deficiencies of Jaffee in regards to the claimed ranges. Please see the discussion above in regards to the disclosure of Gill.

Applicant argues that Gill teaches an air permeability of no more than 225 cubic feet/min while Applicant claims at least 250 cubic feet/min in claim 32. The Examiner submits that the Gill reference is not relied upon for teaching a level of permeability and used only as a secondary reference to teach the combination of microfibers and chopped glass fibers with a certain diameter range. Furthermore, the Examiner has submitted that Jaffee in view of Gill teaches the same invention, therefore, the air permeability can be considered inherent. Please see the rejection above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Boyd whose telephone number is 571-272-1473. The examiner can normally be reached on Monday thru Friday (8:30am - 6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Jennifer Boyd
September 14, 2006

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